

## QE expectations and advice adopted by CEEB meeting Jan 16, 2006

### **Caveat**

The following are recommendations that faculty in CEEB have found useful in having a successful qualifying exam. The formal rules remain as set by the department and the Office of Postdoctoral and Graduate Studies and take precedence over this document.

### **Purpose**

A student's doctoral dissertation will represent the largest, most independent research project ever undertaken by that student (even those with an M.Sc). Research includes planning, execution, and communication of results. The goal of the QE is to ensure that the student is prepared for this undertaking. In extreme cases, the goal is to identify students who are unlikely to be able to successfully complete the work and to limit the investment of time and energy by terminating the process.

As such, the QE is the single most important event in the student's PhD program prior to the defense. It should be treated as such. Innate brilliance and past success are not enough. The student must demonstrate that they are completely prepared to undertake the current research project. It is expected that preparing for the QE will occupy the majority of a student's energy for the semester in which the QE occurs.

### **Step 1a – Supervisory committee**

A student must have both a supervisory committee meeting and a qualifying exam in their second year. Often the QE is required in the 3<sup>rd</sup> semester, but exact requirements vary depending on the master's status and other factors. *It is the student's responsibility to coordinate with the graduate coordinator to ensure that the QE is scheduled at the appropriate time.* Regulations allow a student to request the committee to use the QE as the supervisory committee meeting. The committee may decide during the QE that this request will not be granted, forcing an ensuing committee meeting. In our experience about 10% or so of students have a QE that goes smoothly enough that all are comfortable using the QE as a supervisory committee meeting. There may also be extenuating circumstances such as an advisor who is only in town for a limited period of time. ***It is strongly recommended, barring these unusual circumstances or exceptional preparedness, that the supervisory committee meeting be held a month or two prior to the QE.*** This allows the committee to raise issues that can be resolved prior to the QE rather than during the QE. A common outcome of this meeting will be a ranking of "conditional" depending on passing the qualifying. If the qualifying identifies deficiencies the supervisory committee can then follow up.

### **Step 1b – Proposal**

The student must provide a written proposal for their project to their QE examining committee at least 7 days prior to the scheduled QE. An acceptable proposal must be provided at least 7 days in advance or the QE may need to be rescheduled. ***It is strongly recommended that a draft of the proposal be provided to the supervisory committee at least a few days prior to the supervisory committee meeting mentioned above.*** This allows for maximal feedback to be incorporated prior to the QE.

The proposal should be similar in nature to an NSERC grant application describing the research

approach. In general in your proposal and in all future scientific writing, using subheadings and clear writing to help the reader is a good idea. The guidelines mandate a proposal of 2500 words (approximately 10 pages double spaced). This limit does not include tables, figures, bibliography, figure legends, or a planned timeline to complete work. ***This 2500 word limit will be enforced.*** A proposal of 12 pages might not be rejected (or it might), but a proposal of 15 pages definitely will. Similarly, the presentation at the start of the QE is required to be 1520 minutes. ***This will also be enforced.*** Both the written proposal and the oral presentation may include preliminary results if available but must address the whole of the projected thesis.

- A successful QE will depend heavily on a top-quality proposal. This proposal should go through multiple drafts and be honed to a very finely worded document that shows the clarity of your thinking through conciseness and exact statements. Some topics you should probably cover are listed below. We recommend discussing omissions from this list with your advisor *and your supervisory committee* if you think some of these sections are not relevant to your particular project.

- *Brief* review of the current state of knowledge

- Precise statement of the question and/or hypotheses

- Description of the methods

- Detailed description of the experimental or sample design. Be clear about what factors are being controlled or sampled. Provide specific numbers for how many levels of each factor are planned, and how many

replicates/samples within each factor. Address any issues that arise from finite effort levels in terms of tradeoffs between replication within vs. between factors (i.e. describe why your plan is optimal). Provide a realistic estimate of the amount of time this will require in the lab or field.

- Statistical analysis approach. Describe specific statistical approaches, the output of these approaches, how these can be used to test your hypotheses, assumptions of the tests, and potential problems.

- If you will be using novel measurement techniques, provide a detailed description (if you are using standard techniques then references to the standard techniques are enough).

- Provide a description of each chapter anticipated in the dissertation (this may be incorporated into the above sections or as a separate section).

- A brief statement of the broader importance of the question to your field and to society

- Provide a timeline showing when the research and writing will be performed (this can be an appendix that does not count against your word limit)

## Step 2 - Other preparation

As mentioned above, it is expected that the student will expend considerable time in preparing for the QE. Exact methods will vary, but several ideas that have proved useful in the past include:

- Ask supervisory committee members (or other members of the department) in allied fields what concepts or readings they consider to be necessary background for your research. Then read up.

- Hold a mock QE with fellow students serving as your committee. This will allow you to practice your presentation, get an idea of the questions and weak points you will need to address, and practice answering questions. Some students even select students to act as specific members of the qualifying exam (often students of the professor are chosen).

- Get successful examples. Ask students a year or two ahead of you who you know had a successful QE to share their proposal and presentation with you so you can see what a successful proposal looks like.

- Some general review of basic material is useful. A **quick** review of basic ecological, evolutionary, taxonomic, or genetic theory is helpful. Reviewing statistical methods relative to your research is also useful. Be prepared to answer questions about the assumptions of relevant statistical methods.

- Many students place too much emphasis on memorization of background material. Remember the QE is focused around your research. So while questions on statistics, philosophy of science, or allied fields are fair game, they will be in areas connected to your research in some way. Put the emphasis on having the best description and justification of your proposed research possible.

- Get some rest. Your presentation and thinking skills are being tested too, and these work better with a clear mind. Remember, this is not a comprehensive exam covering all of ecology and evolution (as is done in the US). It is intended to test knowledge and preparedness related to your specific research project. Related work (allied fields) is part of this, but far distant fields with no relevance are not part of the QE.

## Outcomes

In determining this outcome, the members of the committee commit themselves to ensuring that the decisions will not be arbitrary. They will be based on objective evaluation of performance to the degree humanly possible. Three outcomes can be given on a qualifying: unconditional pass, supplemental, or fail. The unconditional pass is clear – no further work is required. The meaning of fail is also fairly clear – the committee does not believe you will be able to complete the research project. They will give you specific details about why. University regulations specify that you have a chance to reverse your fail with answers to written questions submitted within four weeks. As you will know from asking other students, a ranking of fail is rare, but they do occur in this department. The grade of “supplemental” shall be given only in exceptional circumstances where there is *serious* uncertainty about the student’s preparation or ability to complete their research. Under other circumstances where deficiencies are identified (the usual occurrence) a pass will be given and the supervisory committee will take responsibility for ensuring that these deficiencies are addressed before the dissertation defense through various means such as requiring additional courses, additional readings, additional meetings or even additional writings. Failure to meet these supervisory committee guidelines can still result in a determination of “conditional” or “unsatisfactory” in ensuing committee meetings.